



1. How many grams of hydrogen are needed to react with 500g of copper(II) oxide?

$$500\text{g CuO} \times \frac{1\text{mol}}{79.5\text{g}} \times \frac{1\text{mol H}_2}{1\text{mol CuO}} \times \frac{2\text{g H}_2}{1\text{mol}} = 12.6\text{g H}_2$$

2. What is the limiting reagent if 23g of CuO reacts with 1.2g of H₂?

$$\begin{array}{ccccccc} 23\text{g CuO} & \times & \frac{1\text{mol}}{79.5\text{g}} & \times & \frac{1\text{mol H}_2}{1\text{mol CuO}} & \times & \frac{2\text{g H}_2}{1\text{mol}} = 0.59\text{g H}_2 \\ \text{given} & & & & & & \text{needed} \end{array}$$

1.2g H₂

CuO is the limiting reagent.



1. How many moles of sugar are required to react with 5 moles of O_2 ?

$$5\text{mol O}_2 \times \frac{1\text{mol C}_6\text{H}_{12}\text{O}_6}{6\text{mol O}_2} = 0.83\text{mol C}_6\text{H}_{12}\text{O}_6$$

2. What is the limiting reagent if 100g sugar reacts with 180g O_2 ?

$$\underset{\text{given}}{100\text{g C}_6\text{H}_{12}\text{O}_6} \times \frac{1\text{mol}}{180\text{g}} \times \frac{6\text{mol O}_2}{1\text{mol C}_6\text{H}_{12}\text{O}_6} \times \frac{32\text{g}}{1\text{mol}} = \underset{\text{needed}}{106.7\text{g O}_2}$$

180g O_2 $C_6H_{12}O_6$ is the limiting reagent.



3. How many grams of water are produced when 75g of sugar reacts with 75g oxygen?

$$\begin{array}{ccccccc} 75\text{g C}_6\text{H}_{12}\text{O}_6 & \times & \frac{1\text{mol}}{180\text{g}} & \times & \frac{6\text{mol O}_2}{1\text{mol C}_6\text{H}_{12}\text{O}_6} & \times & \frac{32\text{g}}{1\text{mol}} = 80\text{g O}_2 \\ \text{given} & & & & & & \text{needed} \end{array}$$

75 g O₂ O₂ is limiting reagent.

$$75\text{g O}_2 \times \frac{1\text{mol}}{32\text{g}} \times \frac{6\text{mol H}_2\text{O}}{6\text{mol O}_2} \times \frac{18\text{g}}{1\text{mol}} = 42.2\text{g H}_2\text{O}$$

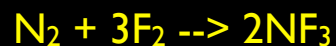
= theoretical yield.

In the lab, I produced 37.1g H₂O. What is my percent yield?

experimental yield = 37.1g

theoretical yield = 42.2g

$$\text{percent yield} = \frac{37.1}{42.2} \times 100 = 87.9\%$$



5. How many grams of nitrogen trifluoride are produced when 210g fluorine reacts with 58g nitrogen?

$$\underset{\text{given}}{58\text{g N}_2} \times \frac{1\text{mol}}{28\text{g}} \times \frac{3\text{mol F}_2}{1\text{mol N}_2} \times \frac{38\text{g}}{1\text{mol}} = 236.1\text{g F}_2 \underset{\text{needed}}{}$$

210g F₂ F₂ is limiting reagent.

$$210\text{g F}_2 \times \frac{1\text{mol}}{38\text{g}} \times \frac{2\text{mol NF}_3}{3\text{mol F}_2} \times \frac{71\text{g}}{1\text{mol}} = 261.6\text{g NF}_3$$

= theoretical yield.

In the lab, 179.8g of NF_3 are produced. What is the percent yield?

experimental yield = 179.8g

theoretical yield = 261.6g

$$\text{percent yield} = \frac{179.8\text{g}}{261.6\text{g}} \times 100 = 68.7\%$$